Primrose, Annette

From:	Fiehweg, Robert
Sent:	Tuesday, June 08, 1999 8:34 AM
To:	Primrose, Annette; Greengard, Tom
Subject:	FW: SPP Treatment System Effluent Concentrations

Here's Rich's communication.

Bob

|	
From:	RICH HORSTMANN [SMTP:rohorstm%smtpgate.dphe.state.co.us@inet.rfets.gov]
Sent:	Monday, June 07, 1999 5:20 PM
To:	Robert.Fiehweg@exchange.rfets.gov; cspreng%smtpgate.dphe.state.co.us@inet.rfets.gov; etpottor% smtpgate.dphe.state.co.us@inet.rfets.gov; jlbruch%smtpgate.dphe.state.co.us@inet.rfets.gov; jwlove% smtpgate.dphe.state.co.us@inet.rfets.gov; sgunders%smtpgate.dphe.state.co.us@inet.rfets.gov
Subject:	SPP Treatment System Effluent Concentrations

Attached is a spreadsheet showing how I calculated that the SPP
treatment system will likely have to produce an effluent of a maximum of
about 50 mg/l in order to maintain surface water quality standards.

I have a separate spreadsheet with the low-flow analysis that I will send
later.

It may be appropriate for me to send this to you after a more formal
CDPHE internal review and EPA approval. I will let you know if that is
true.

SPPEFF.XLS

½   AR-99- 000051
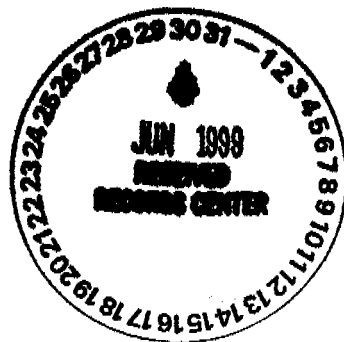
I101-B-00037

Calculation of SPP Treatment System Effluent Concentration Required to Meet Surface Water Quality Standards

**Loading Above Pond A-3 (Stations GS13) = Loading From SW091+ Treated SPP Loading + SPP Loading Bypassing Interception
+ Upstream Loading**

From information from Elizabeth Pottorf, SPP loading bypassing interception is likely to be negligible. At low-flows, the loading from
SW091 is zero, and (based upon only a single sample), upstream loading (measured at SW118) may to be neglected. Therefore, the allowable
loading from the treated SPP groundwater is equal to the instream TMDL (total maximum daily load) that will exist below the point where
the treated groundwater re-enters the stream -- which will be assumed to be at GS13.

The TMDL is calculated below for low-flow conditions, with an implicit margin of safety based upon the use of a 1-in-3 year low-flow
condition. The total flow used for the TMDL is the instream low-flow plus the treated SPP flow. Stream low-flows are based upon flows measured
at SW093, for the period Oct. 1996 to Oct. 1998. Treated SPP flows are estimated to be 0.008 MGD. The combination of these two flows
along with the underlying stream standard of 10 mg/l is used to calculated the TMDL as shown below.

Analysis For New Reactive Barrier System - Long Term Conditions (10 mg/l Standard Applies Everywhere)
For Low-Flow Conditions

Location	Flow	NO3 Conc.	NO3 Loading
N. Walnut Ck Upstrm of SPP	SW093 1E3 Base Flow 0.033 MGD	CDPHE Special Study SW118 Conc. 0	Calculated 0
SW091	Assume Zero		
SPP Bypassing Interception	Assume Negligible - hundredths of lbs/day - from Elizabeth P.		
Above A-3 (at GS13)	Sum of 093 & Intercepted and Treated SPP Flow 0.033 MGD + 0.008 MGD	10 mg/l Allowable Conc.	Calculated TMDL, lbs/day 3.42
Treated SPP Loading	SPP Treates Flow, MGD 0.008	Unknown To Be Solved For ************************************	Allocated Wasteload, lbs/day 3.42

From above figures, the Treated SPP effluent nitrate concentration needs to be below
$(3.42 / (0.008 * 8.34)) =$ **51.25 mg/l**

Conclusions:

As long as the effluent concentration from the SPP treatment system is less than 51 mg/l, the stream standard will likely be met except
under extreme low-flow conditions. However, because of several uncertanties associated with the factors used in the above analysis, it
would probably be appropriate to use a somewhat lower concentration as an "action level" for effluent monitoring.

Some of the more critical limitations of the above analysis are:

1) there may be other flows scenarios that would result in a more restrictive Treated SPP effluent concentration
2) the upstream loading estimate is based upon only 1 sample
3) upstream low-flows were based upon flows measured at SW093, which may be affected by flows from the SPP
4) upstream low-flows are based upon a limited data record -- less than the minimum of 3 years required by standard low-flow analytical software